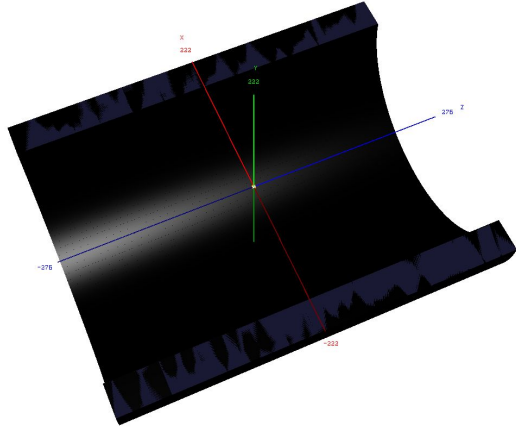# SPD ECAL performance in solenoidal geometry.
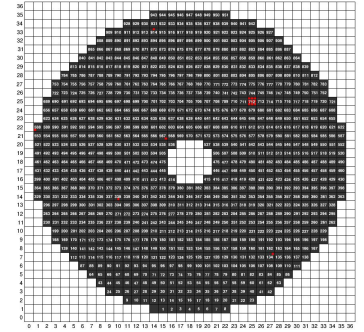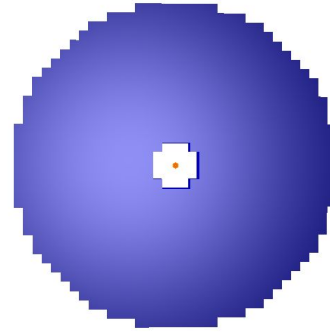
Rymbekova Aierke
Dzhelepov laboratory of nuclear problems
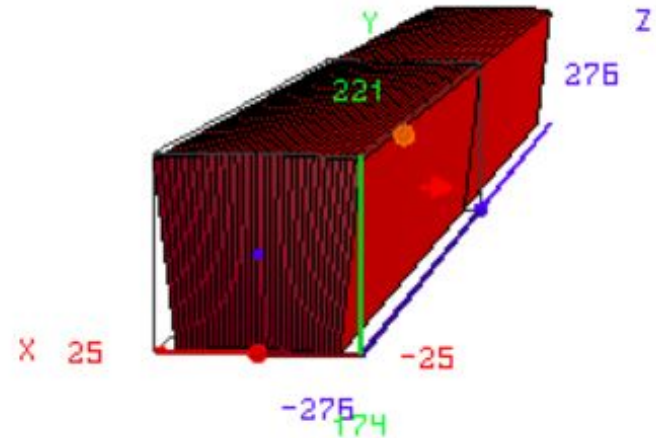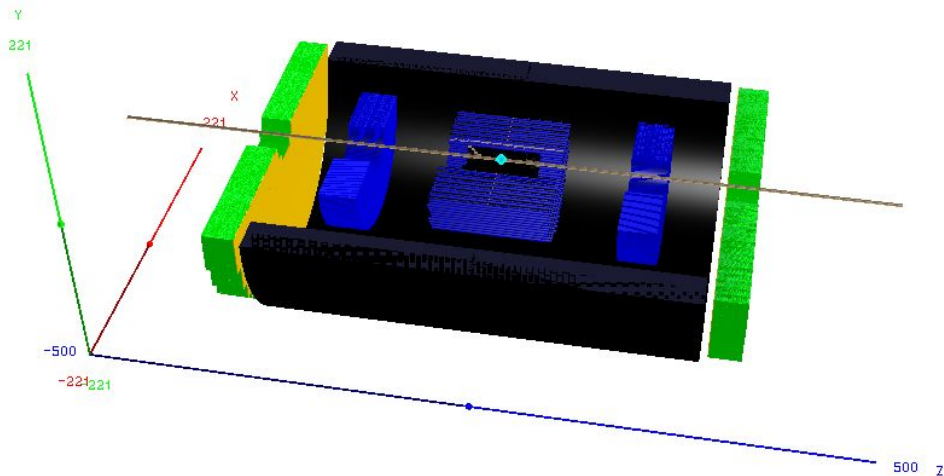
Electromagnetic calorimeter (ECAL)

Calorimeter has barrel part and end-caps.

The radiation length and Moliere radius is 1.64 and 3.5 cm.

The module has 221 layers of the scintillator and absorber (Pb) of 12x12 cm in cross section and 0.15 (0.03) cm thick (12.52 X_0) , respectively.

barrel length   552.0 cm
barrel radius   174.8 cm

The barrel has 138 modules along the beam axis and 336 modules along φ

end-cap radius   221.24 cm
hole radius   25 cm

The end-cap has 952 modules
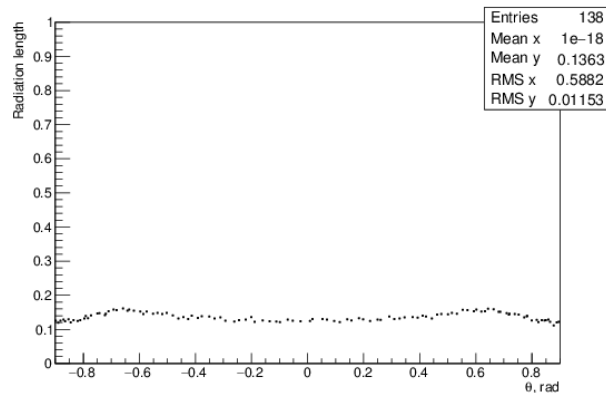
Beryllium tube
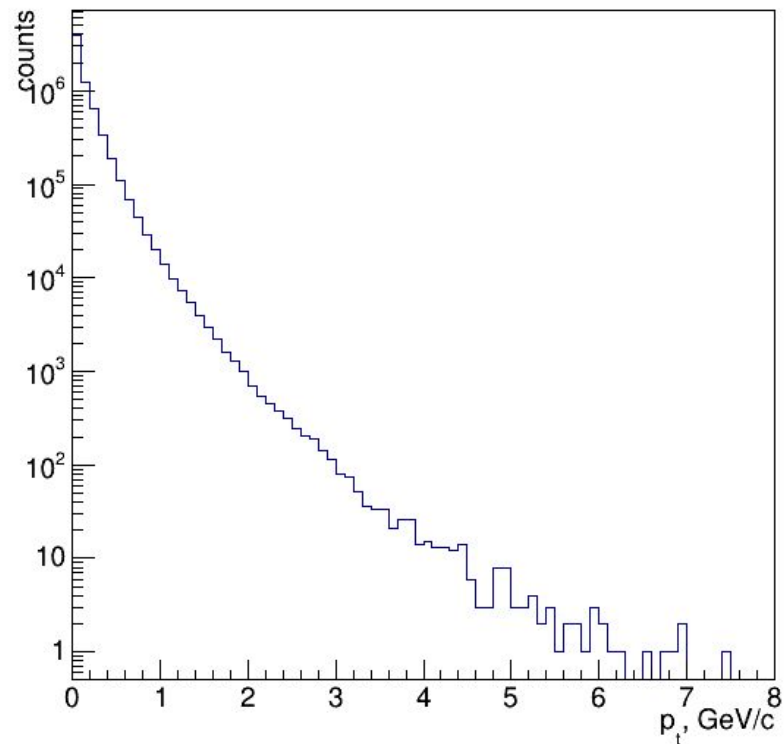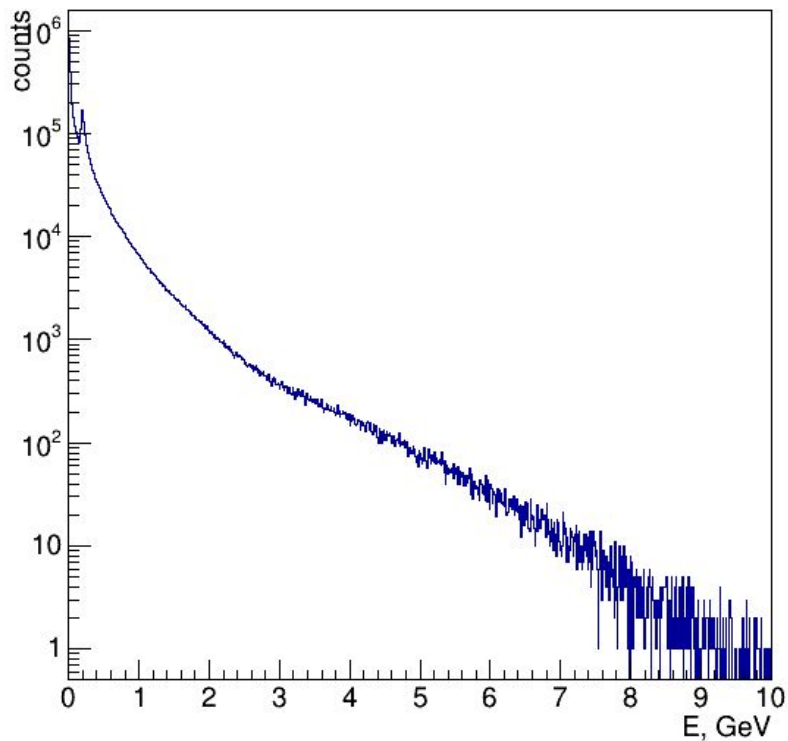   radiation length is 0.003
Vertex detector
     radiation length is 0.017
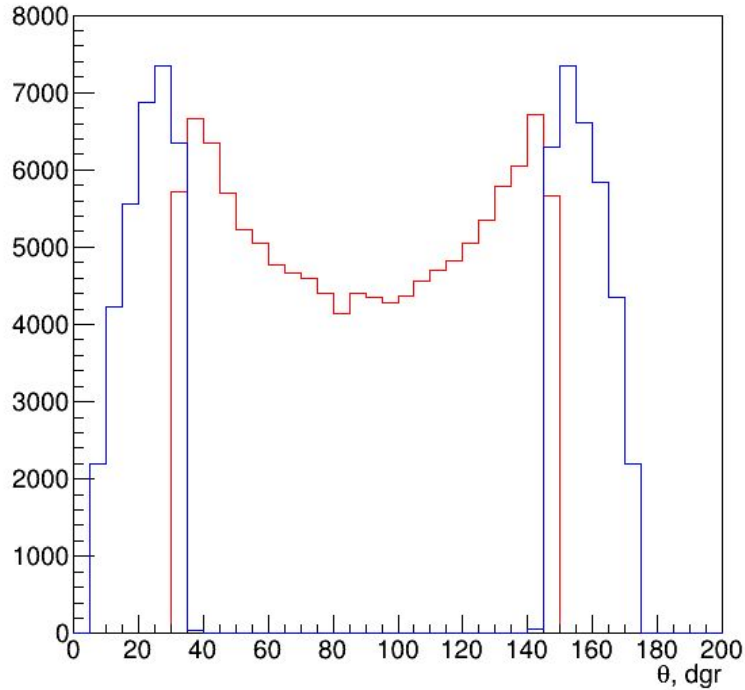Straw-tube tracker
     radiation length is 0.105

3

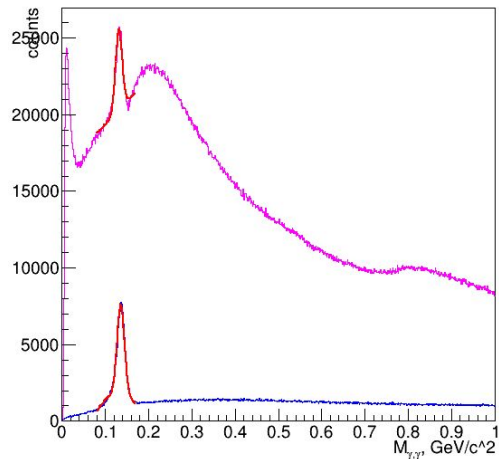number of clusters in calorimeter as function energy and transverse momenta

200 000 p-p collisions. SpdRoot, minimum bias events

number of clusters in barrel (red line) and end-caps (blue line) for promt photon

200 000 p-p collisions. Pythia 6, SpdRoot

π⁰ reconstruction

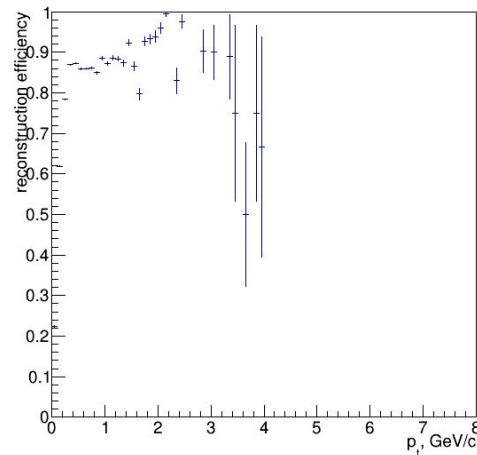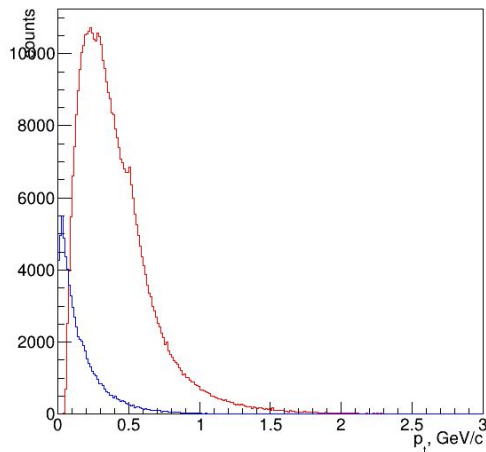

Gaussian fit
for all clusters (purple line) :

N = 107 877 ±1 734.58
σ = 8.039 ±0.114 MeV

for clusters only from γ (blue line) :
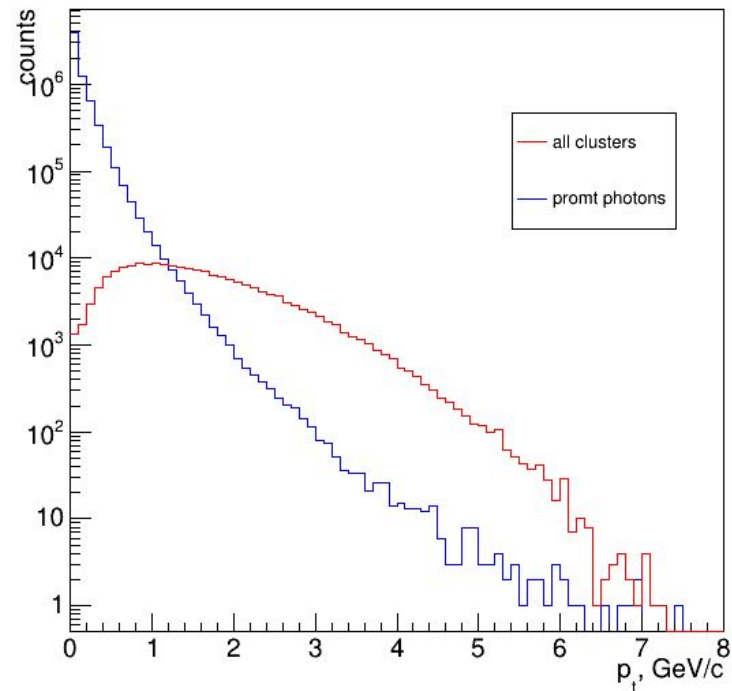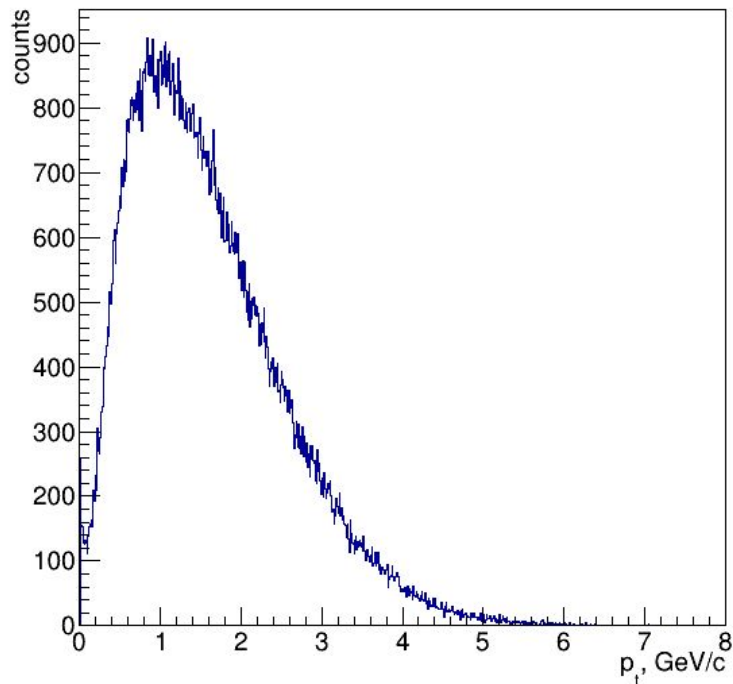
N = 122 323±743.718
σ = 8.451±0.457

SpdRoot. Minimum bias events. 200 000 p-p collisions. Eγ>0.5 GeV

Promt photons

quark - gluon Compton process (qg→qγ) $\sigma_{qg \to q\gamma} = 1.22 \cdot 10^{-3} mb$ $\sigma_{pp} = 40\ mb$

200 000 p-p collisions. Pythia 6, SpdRoot

Using the preliminary version of the SpdRoot package, the interaction of photons generated at the collision point of beams with the SPD setup was simulated.

At these installation parameters, the decay of the neutral pion by 2 photons was reconstructed.

In the range of large transverse momenta, the probability of detecting direct photons increases.